General

Guideline Title

Clinical practice guideline: screening children and adolescents for type 2 diabetes mellitus in primary care.

Bibliographic Source(s)

University of Texas at Austin, School of Nursing, Family Nurse Practitioner Program. Screening children and adolescents for type 2 diabetes mellitus in primary care. Austin (TX): University of Texas at Austin, School of Nursing; 2011 May. 15 p. [32 references]

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

Strength of recommendations (A, B, C, D, I) and quality of evidence (good, fair, poor) are defined at the end of the "Major Recommendations" field.

Benefits of Screening

Untreated or poorly treated diabetes mellitus can lead to coronary artery disease, peripheral vascular disease, neuropathy, blindness, renal failure, and early death.

Type 2 diabetes was formerly known as adult-onset diabetes as it was rarely seen in the young. In the past two decades, according to the Centers for Disease Control and Prevention's (CDC's) SEARCH Study for Diabetes in Youth, it has been reported among U.S. children and adolescents with increasing frequency (Mayer-Davis et al., 2009) (Grade A, Evidence Good). Type 2 diabetes is diagnosed almost as frequently in the young as type 1 diabetes, especially overweight or obese youth in certain racial/ethnic groups (Mayer-Davis et al., 2009) (Grade A, Evidence Good). Early screening for diabetes can detect the disease while it is asymptomatic. Implementing appropriate interventions during this period can prevent or delay complications of the disease (American Diabetes Association [ADA], 2011).

Clinical Screening Considerations

Patient Population under Consideration

This recommendation applies to children and adolescents from age 10 or at onset of puberty (whichever comes first) to 19 years (ADA, 2011).

Risk Assessment

1. Children and adolescents in the population under consideration who are overweight and have any two other risk factors should be screened every three years for diabetes (ADA, 2011) (Grade A, Evidence Good).
    - Overweight is defined as body mass index (BMI) ≥85th percentile for age and gender using the 2000 CDC growth charts (CDC, 2009; Kuczmarski et al., 2002; Barlow & The Expert Committee, 2007), weight for height >85th percentile, or weight >120% of ideal weight for height (ADA, 2011).
    - Overweight plus any two of the following risk factors:
        - 1st degree and/or 2nd degree relative with diabetes (ADA, 2011; Gilliam et al., 2007; Valdez et al., 2007) (Grade A, Evidence Good)
        - Race/ethnicity (Native American, African American, Latino, Asian, Pacific Islander, Native Alaskan) (ADA, 2011; CDC, 2011; Mayer-Davis et al., 2009) (Grade A, Evidence Good)
        - Signs of insulin resistance or conditions associated with insulin resistance (ADA, 2011):
            - Acanthosis nigricans (Bonet et al., 2007; Kong et al., 2007; Brinkman et al., 2010) (Grade A, Evidence Good)
            - Hypertension (Rodriguez et al., 2010) (Grade A, Evidence Good)
            - Dyslipidemia (Kershnar et al., 2006; Newfield, Dewan, & Jain, 2008) (Grade A, Evidence Good)
            - Polycystic ovarian syndrome (Moran et al., 2010; Nur, Newman, & Siqueira, 2009) (Grade A, Evidence Good)
        - Maternal history of diabetes or gestational diabetes during the child's gestation (ADA, 2011; Dabelea et al., 2008; Pettitt et al., 2008) (Grade A, Evidence Good)

2. Children and adolescents who are obese should be screened without regard to risk factors (Liu et al., 2010) (Grade A, Evidence Good).
    - Obesity is defined as body mass index ≥95th percentile for age and gender using the 2000 CDC growth charts (Kuczmarski, 2002; Barlow & The Expert Committee, 2007).

3. Any child or adolescent, regardless of age or risk factors, with symptoms of diabetes including polyuria, polydipsia or unexplained weight loss, and a casual (without regard to time of last meal) plasma glucose of ≥200 mg/dl is diagnostic of diabetes (ADA, 2011) (Grade A, Evidence Good).

4. Other associated risks and conditions are listed and should be considered when determining further screening, screening intervals, or treatment options:
    - Diet high in calories and fat (ADA, 2011)
    - Lack of physical activity (ADA, 2011; Shaibi et al., 2009) (Grade A, Evidence Good)
    - Peripheral neuropathy (Karabouta et al., 2008) (Grade B, Evidence Fair)
    - Preterm birth (Kajantie et al., 2010) (Grade B, Evidence Fair)
    - Low birth weight (Wei et al., 2007) (Grade B, Evidence Fair)
    - Birth weight >9 pounds (Wei et al., 2007) (Grade B, Evidence Fair)
    - Low socioeconomic status (Lidfeldt et al., 2007; Maty et al., 2008) (Grade A, Evidence Good)

Definitions:

Strength of Recommendation (Based on U.S. Preventive Services Task Force [USPSTF] Ratings)

A. The USPSTF strongly recommends that clinicians provide the service to eligible patients. *The USPSTF found good evidence that the service improves important health outcomes and concludes that benefits substantially outweigh harms.*

B. The USPSTF recommends that clinicians provide the service to eligible patients. *The USPSTF found at least fair evidence that the service improves important health outcomes and concludes that benefits outweigh harms.*

C. The USPSTF makes no recommendation for or against routine provision of the service. *The USPSTF found at least fair evidence that the service can improve health outcomes but concludes that the balance of benefits and harms is too close to justify a general recommendation.*

D. The USPSTF recommends against routinely providing the service to asymptomatic patients. *The USPSTF found at least fair evidence that the service is ineffective or that harms outweigh benefits.*

I. The USPSTF concludes that the evidence is insufficient to recommend for or against routinely providing the service. *Evidence that the service is effective is lacking, of poor quality, or conflicting and the balance of benefits and harms cannot be determined.*

Quality of Evidence (Based on USPSTF Ratings)

The USPSTF grades the quality of the overall evidence for a service on a 3-point scale (good, fair, poor).

Good: Evidence includes consistent results from well-designed, well-conducted studies in representative populations that directly assess effects on health outcomes.

Fair: Evidence is sufficient to determine effects on health outcomes, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies, generalizability to routine practice, or indirect nature of the evidence on health outcomes.

Poor: Evidence is insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information on important health outcomes.

Clinical Algorithm(s)

A clinical algorithm is provided in the original guideline document for screening children and adolescents for type 2 diabetes mellitus in primary care.

Scope

Disease/Condition(s)

Type 2 diabetes mellitus (T2DM)

Guideline Category

Diagnosis

Evaluation

Prevention

Risk Assessment

Screening

Clinical Specialty

Cardiology

Endocrinology

Family Practice

Internal Medicine

Nursing

Pediatrics

Preventive Medicine

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Health Care Providers

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

- To provide evidence to support screening children and adolescents who are at high risk for type 2 diabetes mellitus (T2DM)
- To provide a step-wise approach for screening methods

Target Population

Children and adolescents from age 10 years or at onset of puberty to age 19 years with certain risk factors for type 2 diabetes mellitus (T2DM)

Interventions and Practices Considered

Risk Assessment/Evaluation

1. Risk assessment based on body mass index (BMI), family and personal history, and the presence of signs of or conditions associated insulin resistance
2. Screening for type 2 diabetes mellitus (T2DM) using fasting plasma glucose, 2-hour oral-glucose tolerance test, and glycated hemoglobin (HbA1c)
3. Lifestyle modifications:
    - Eating a healthy diet (nutritional education recommended and should consider the growth and development of the child)
    - Increased daily physical activity
    - Maintaining a healthy weight

Note: The original guideline document contains more detailed information concerning screening challenges and testing results.

Major Outcomes Considered

Accurate screening and identification of children and adolescents at risk for type 2 diabetes mellitus (T2DM)

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

- Searches of Electronic Databases: PubMed, CINAHL, Cochrane Review, Clinical Pharmacology Database, Online Journals.
- Keyword Searches: T2DM and screening in children and adolescents, previous T2DM guidelines, insulin resistance (all signs and conditions associated with) in children and adolescents, obesity in children and adolescents, ethnicity and T2DM, family history of T2DM, all risk factors associated with T2DM.
- Inclusion Criteria: Children and adolescents 10-19 years, English language, peer reviewed, publication years 2006-2011.
- Exclusion Criteria: Children up to 10 years, adults ≥20 years.

Number of Source Documents

32

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

The U.S. Preventive Services Task Force (USPSTF) grades the quality of the overall evidence on a 3-point scale (good, fair, poor).

Good: Evidence includes consistent results from well-designed, well-conducted studies in representative populations that directly assess effects on health outcomes.

Fair: Evidence is sufficient to determine effects on health outcomes, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies, generalizability to routine practice, or indirect nature of the evidence on health outcomes.

Poor: Evidence is insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information on important health outcomes.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Informal Consensus

Description of Methods Used to Formulate the Recommendations

Family Nurse Practitioner students developed a draft that was submitted to the University of Texas at Austin nursing faculty for review. Revisions were made after recommendations were received.

Rating Scheme for the Strength of the Recommendations

The U.S. Preventive Services Task Force (USPSTF) grades its recommendations according to one of five classifications (A, B, C, D, I) reflecting the strength of evidence and magnitude of net benefit (benefits minus harms).

A. The USPSTF strongly recommends that clinicians provide the service to eligible patients. *The USPSTF found good evidence that the service improves important health outcomes and concludes that benefits substantially outweigh harms.*

B. The USPSTF recommends that clinicians provide the service to eligible patients. *The USPSTF found at least fair evidence that the service*

improves important health outcomes and concludes that benefits outweigh harms.

C. The USPSTF makes no recommendation for or against routine provision of the service. *The USPSTF found at least fair evidence that the service can improve health outcomes but concludes that the balance of benefits and harms is too close to justify a general recommendation.*

D. The USPSTF recommends against routinely providing the service to asymptomatic patients. *The USPSTF found at least fair evidence that the service is ineffective or that harms outweigh benefits.*

I. The USPSTF concludes that the evidence is insufficient to recommend for or against routinely providing the service. *Evidence that the service is effective is lacking, of poor quality, or conflicting and the balance of benefits and harms cannot be determined.*

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

An outside specialist provided final external review.

Evidence Supporting the Recommendations

References Supporting the Recommendations

American Diabetes Association. Standards of medical care in diabetes--2011. Diabetes Care. 2011 Jan;34(Suppl 1):S11-61. [395 references] PubMed

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Type of Evidence Supporting the Recommendations

The type of supporting evidence is specifically stated for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Screening children and adolescents with certain risk factors can detect insulin resistance and diabetes early in the disease progression. Early detection and treatment can promote lifestyle changes and/or treatment before severe complications occur. Lifestyle changes such as diet and exercise could even prevent or delay the development of diabetes.

Potential Harms

Not stated

Qualifying Statements

Qualifying Statements

This guideline was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take this fully into account when exercising their clinical judgment. The guideline does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or the parent, guardian or caregiver.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Clinical Algorithm

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

University of Texas at Austin, School of Nursing, Family Nurse Practitioner Program. Screening children and adolescents for type 2 diabetes mellitus in primary care. Austin (TX): University of Texas at Austin, School of Nursing; 2011 May. 15 p. [32 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2011 May

Guideline Developer(s)

University of Texas at Austin School of Nursing, Family Nurse Practitioner Program - Academic Institution

Source(s) of Funding

University of Texas at Austin, School of Nursing, Family Nurse Practitioner Program

Guideline Committee

Practice Guidelines Committee

Composition of Group That Authored the Guideline

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Financial Disclosures/Conflicts of Interest

None

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Request at fsonstein@mail.nur.utexas.edu

Print copies: Available from the University of Texas at Austin, School of Nursing. 1700 Red River, Austin, Texas, 78701-1499, Attn: Nurse Practitioner Program

Availability of Companion Documents

None available

Patient Resources

None available

NGC Status

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